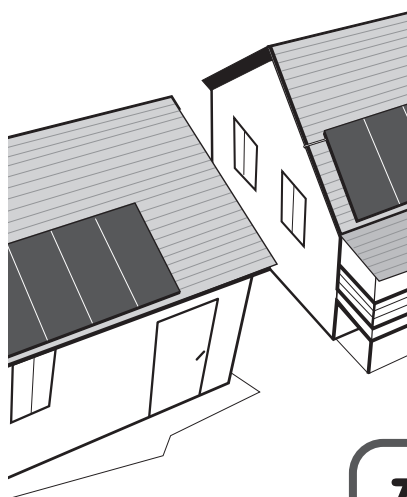


# USER'S GUIDE

## **LEONICS®**



### **APOLLO S-120AM**

Authorized Distributor



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**STAND-ALONE INVERTER with  
MPPT CHARGE CONTROLLER**

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## SAFETY INSTRUCTIONS

Please read and follow this user's manual carefully and completely.

**Important :** Please keep this user's manual for later reference. It consists of Introduction, Front and Rear Panel, Installation and Operation, and Troubleshooting.

If the inverter does not operate properly and you cannot solve the problem using the troubleshooting information in this user's manual, please contact LEONICS local distributors, LEONICS Service Center, send e-mail to support@leonics.com or visit www.leonics.com.


To help you much more quickly when contact us, please record the following information:

LEONICS APOLLO model : \_\_\_\_\_  
Serial number : \_\_\_\_\_  
Purchased date : \_\_\_\_\_  
Purchased from : \_\_\_\_\_

### **WARNING!**

Risk of electric shock, DO NOT remove cover. No user serviceable part inside, please refer servicing to qualified service personnel.

### **1.1 Electrical Safety**

- 1.1.1 Do not work alone where there are electrically hazardous conditions.
- 1.1.2 Contact with live conductors will cause burns and dangerous electric shock.
- 1.1.3 Only qualified electricians should install or service this unit, PV panel and batteries.
- 1.1.4 Properly install and ground (  ) the equipment in accordance with the instruction manual.
- 1.1.5 Periodically check your cable, terminal and power source to make sure that they are in good condition.
- 1.1.6 To reduce risk from electric shock , disconnect all power source before connecting / disconnecting the batteries or loads or when maintaining or servicing this unit.

## 1.2 Safety instruction for installation and operation

- 1.2.1 Before installing or using this unit, read all instructions and caution markings on the charge controller, PV panel, battery and all sections of this user guide.
- 1.2.2 Install this unit in a temperature and humidity controlled indoor area with adequate air flow and away from chemical particles or flammable substances . Avoid installing the unit near radio transmission station, heat dissipation equipment and direct sunlight.
- 1.2.3 This unit has ventilation grills. Ensure that sufficient ventilation is provided. DO NOT block the ventilation grills.
- 1.2.4 Use insulated tools to reduce your risk of electric shock.
- 1.2.5 Remove all jewelry or other metal objects such as rings, necklace, bracelets and watches when installing this product.
- 1.2.6 Do not install this unit directly above the batteries or in the same compartment as vented batteries. Batteries generate gas, which is corrosive to electronic equipment.

## 1.3 Safety instruction for PV panel

- 1.3.1 Before installation, please read instruction books or user's manual for PV panel and system.
- 1.3.2 Whenever PV array is exposed to sunlight, a shock hazard exists at the output cables or exposed terminal. To reduce the risk of shock, disconnect the array, or cover it with an opaque cloth or material before making electrical connections or servicing the system.
- 1.3.3 Ensure correct polarity connection of PV panels.

## 1.4 Safety Instruction when working with battery

- 1.4.1 Ensure the area around the battery is well ventilated.
- 1.4.2 Never smoke or allow a spark or flam near battery.
- 1.4.3 Be extra cautions to reduce the risk of dropping a metal tools onto battery. It might spark or short circuit battery or other electrical parts that may cause an explosion.
- 1.4.4 Remove all metal items, like rings, bracelets and watches when working with batteries.
- 1.4.5 Have someone within range of your voice or close enough to come to your aid when you work near battery.

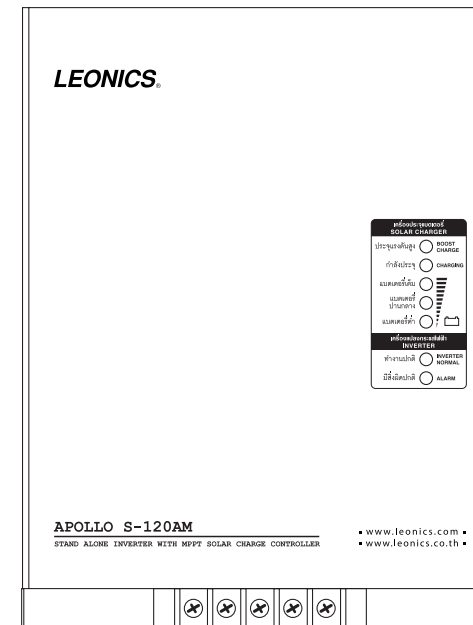
## INTRODUCTION

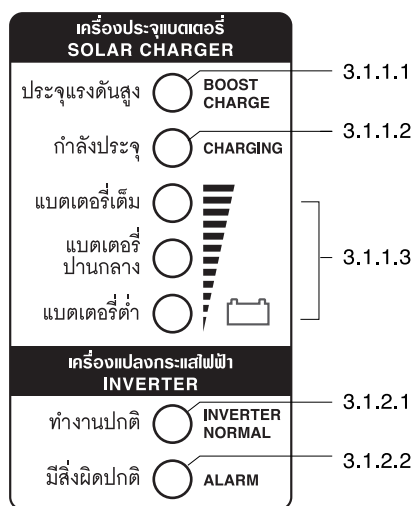
APOLLO S-120AM series is a compact high efficiency solar charger built-in stand alone inverter controlled by microprocessor. Inverter is used for transforming DC power to AC power in order to supply AC loads. Solar charger will charge battery when DC power from PV is detected with 3 stages charging. And built-in MPPT (Maximum Power Point Tracking) to maximize power generated by PV.

### Features :

- Microprocessor Control
- Short circuit, Overload, Overcharge and Overdischarge Protection
- Quick and smart charging for battery
- Reverse polarity protection for PV
- LED indication
- Built-in MPPT (Maximum Power Point Tracking)

## FRONT AND REAR PANEL





### 3.1 Front Panel

3.1.1 **SOLAR CHARGER** show solar charger and battery status.

3.1.1.1 **BOOST CHARGE** : APOLLO S-120AM series is operating in boost charging mode.

3.1.1.2 **CHARGING** : APOLLO S-120AM series is charging the battery.

3.1.1.3 **Battery Level** : The indicator light show the full, medium and low battery level.

3.1.2 **INVERTER** show inverter status.

3.1.2.1 **INVERTER NORMAL:** Inverter is operating.

3.1.2.2 **ALARM** : The APOLLO S-120AM series is in abnormal conditions.

Table1 :Indicator Lights and Charging Status

STATUS	BOOST CHARGE indicator (green)	CHARGING indicator (green)
Bulk charging	off	lit
Boost charging	blink (on 1.4 sec., off 0.2 sec.)	blink (on 1.4 sec., off 0.2 sec.)
Float charging	off	blink (on 0.8 sec., off 0.8 sec.)
Not operating	off	off

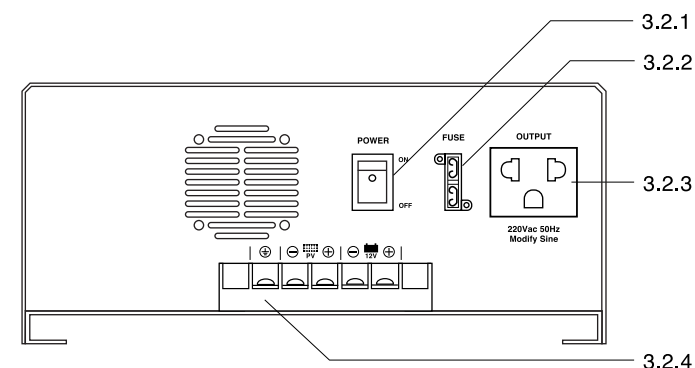
Table 2 :Indicator Light and Battery Status

STATUS	first indicator (green)	second indicator (yellow)	third indicator (red)
Full battery	lit	off	off
Medium battery	off	lit	off
Low battery	off	off	blink

Table 3 :Indicator Lights and Inverter Status

STATUS	INVERTER indicator (green)	ALARM indicator (red)
Inverter is operating	lit	off
Over temperature	-	slow blink
Low battery alarm	-	blink
Overload alarm	-	quick blink
Inverter fault alarm	-	lit

### 3.2 Rear Panel



3.2.1 **POWER SWITCH** Switch for turn on-off APOLLO S-120AM series.

3.2.2 **FUSE** A safety component for protect system from overload or battery short circuit.

3.2.3 **TERMINALS** The terminal for connecting to ground, PV and battery. (see Installation and Operation)

3.2.4 **OUTPUT** Plug receptacles directly connect to AC loads.

## INSTALLATION AND OPERATION

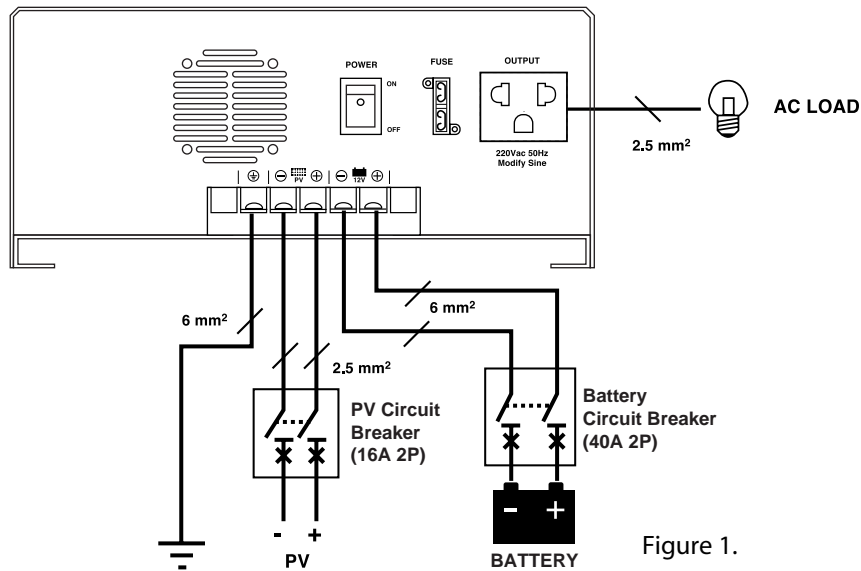



Figure 1.

Sample of connection diagram is shown above. Before installing or using this unit, read all instructions and caution markings on this unit, PV panel, batteries and all sections of this user's guide.

For your safety, all cables should be wired in the suitable size conduits.

### 4.1 Installation

- 4.1.1 Turn off Power switch and turn off all breaker.
- 4.1.2 Connect grounding wire at the PE/EARTH (  ) position by using copper wire sizing in Figure 1.
- 4.1.3 Connect battery cable from positive (+) battery to positive (+) terminal at rear panel and negative (-) battery to negative (-) terminal at rear panel through battery circuit breaker.
- 4.1.4 Connect PV cable from positive (+) PV array to positive (+) terminal at rear panel and negative (-) PV array to negative (-) terminal at rear panel through PV circuit breaker.
- 4.1.5 Plug-in AC loads at AC Output receptacle.

### 4.2 Start up Procedure

- 4.2.1 Turn off all AC loads that connected to APOLLO S-120AM series.
- 4.2.2 Turn on battery breaker and PV circuit breaker respectively.
- 4.2.3 Turn on the power switch after the INVERTER indicator is lit.
- 4.2.4 Turn on AC loads that connected to APOLLO S-120AM series.

### 4.3 Shut down Procedure

- 4.3.1 Turn off all AC loads that connected to APOLLO S-120AM series.
- 4.3.2 Turn off the power switch.
- 4.3.3 Turn off PV circuit breaker and battery circuit breaker respectively.

## TROUBLESHOOTING

If the inverter does not operate properly and you cannot solve the problem using the troubleshooting information in this users manual, please contact your LEONICS local distributors, LEONICS Service Center, send e-mail to [support@leonics.com](mailto:support@leonics.com) or visit [www.leonics.com](http://www.leonics.com).

SYMPTOMS	CAUSE	SOLUTION
ALARM indicator is lit (red).	- Short circuit of AC loads. - APOLLO S-120AM inverter is fault.	- Check AC cable connected to APOLLO S-120AM series - Consult service center.
INVERTER indicator is lit, but there is no AC power from AC outlet.	The inverter is overloaded and shutdown itself (overload shutdown condition).	- Turn off AC loads and inverter follow item 4.3. Disconnect some loads, the restart again follow item 4.2.
The power switch is on but inverter does not operate or INVERTER NORMAL is off.	Battery voltage is too low until the inverter can not operate (Low battery shut - down condition).	- Turn off the power switch and restart again and wait until the INVERTER NORMAL indicator is lit or the inverter start battery charging.
ALARM indicator blink slowly.	Over temperature condition	- Ensure that sufficient ventilation is provided. - Ensure that the ventilation fan at the rear side work properly.

## SPECIFICATIONS

MODEL			S-120A-M37	S-120A-M59
INPUT	Inverter mode	Nominal voltage Voltage range	12 Vdc 10 - 16 Vdc	
	Charger mode	PV maximum voltage MPPT tracking voltage	70 Vdc 26 - 70 Vdc	92 Vdc 40 - 92 Vdc
OUTPUT	Inverter mode	Power continuous Max. surge power Voltage range Frequency Wave form	150 VA / 150 Watt 200% of continuous power 220 Vac $\pm$ 3% (230 Vac option) 50 Hz $\pm$ 0.1% (crystal control) (60 Hz option) Modified sine wave	
	Charger mode	Nominal Max. charge current	12 Vdc 10 A	
SYSTEM	Inverter maximum efficiency at full load Pf.= 1		> 80%	
	Low battery disconnect		< 10.3 - 11.0 Volt pre-adjust	
PROTECTION			Over temperature / Overload / Short circuit / Reverse (PV) polarity / Transient voltage / Over charge / Over discharge	
INDICATOR	Solar Charger	Status	Boost charge (green) Charging (green)	
		Battery level	Full Battery (green) Medium Battery (yellow) Low Battery (red)	
	Inverter	Status	Inverter normal (green) Alarm (red)	
ALARM	LED		Low battery / Overload / Short circuit / Over temperature	
VENTILATION	Fan		Automatic control	
OPERATING	Temperature		0 - 45°C	
CONDITION	Relative humidity		0 - 95% (non - condensing)	
DIMENSION	W x H x D (cm.)		16.5 x 29.5 x 9.6	
WEIGHT	Approximate in kg.		5.5	

Continuous product development is our commitment. In that manner, the above specifications may be change without prior notice.